MEMBRANE SUITABLE FOR USE IN AN ANALYTE SENSOR, ANALYTE SENSOR, AND ASSOCIATED METHOD

ABSTRACT

A multifunctional membrane is provided. The multifunctional membrane is suitable for use in an analyte sensor. In a particular application, the multifunctional membrane may be used in connection with an amperometric biosensor, such as a transcutaneous amperometric biosensor. Some functions of the membrane are associated with properties of membrane itself, which is comprised of crosslinked polymers containing heterocyclic nitrogen groups. For example, the membrane, by virtue of its polymeric composition, may regulate the flux of an analyte to a sensor. Such regulation generally improves the kinetic performance of the sensor over a broad range of analyte concentration. Other functions of the membrane are associated with functional components, such as a superoxide-dismutating/catalase catalyst, either in the form of an enzyme or an enzyme mimic, that can be bound to the scaffold provided by the membrane. The effect of any such enzyme or enzyme mimic is to lower the concentration of a metabolite, such as superoxide and/or hydrogen peroxide, in the immediate vicinity of the sensing layer of the biosensor. Lowering the concentrations of such metabolites, which are generally deleterious to the function of the sensor, generally protects or enhances biosensor integrity and performance. The membrane is thus an important tool for use in connection with analyte sensors, amperometric sensors, biosensors, and particularly, transcutaneous biosensors. A membrane-covered sensor and a method for making same are also provided.